Space Weather Forecast

Issued on Tuesday, 13 February 2024 at 00:47 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: CME arrivals possible from Day 1 into Day 2 (13-14 Feb), with G1/Minor Storm intervals likely and a chance of G2/Moderate Storms. Moderate flares expected, with a chance of Strong flares. S1/Minor radiation storm likely to slowly decline.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Activity was Moderate with the peak flare at 12/0348 UTC, from the largest region in the southwest. A long period flare peaking at 12/2117 UTC was also seen from over the northeast limb. There are seven sunspots on the visible disc. The largest region continues to be primarily comprised of negative polarity spots, but with some magnetic complexity persisting to the north of its main leader. Slow growth has continued in the region near north centre disc, with some coalescence in the intermediate spots of the region in the northeast, plus an increase in length. Both these regions have some slight magnetic complexity. The new region on the northeast limb may be the leader of a larger region, with flare and CME (Coronal Mass Ejection) activity evident from over the limb.

Several large and fast CMEs have been observed in the last 24 hours, however none are currently expected to be Earth directed, although analysis is ongoing.

Solar Wind / Geomagnetic Activity: Solar winds showed waning CME influence. Wind speeds were initially elevated, around 550 km/s, but declined to slightly elevated levels near 470 km/s. Interplanetary Magnetic Field (IMF) was weak, with the north-south component varying weakly but mostly northward directed. Geomagnetic activity was Quiet (Kp 0-2).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) started the period just below the S1/Minor Radiation Storm level, but rose above S1 soon after 12/0800Z, then continued to rise, briefly touching the S2/Moderate threshold around 12/2130 UTC.

Four-Day Space Weather Forecast Summary

Solar Activity: Moderate activity is expected with further Moderate flares, and a chance of Strong flares. These most likely from the large region in the southwest, or perhaps from the new region rotating onto the northeast limb.

Solar Wind / Geomagnetic Activity: There are three CMEs which may have Earth-directed impacts, two of which are potential glancing blows during Day 1 (13 Feb), with a third more likely arrival late Day 1 into early Day 2 (13-14 Feb), but low confidence in the extent of any impacts. This has the potential to combine with the previous impacts, leading to a risk of enhanced response. Solar winds are then expected to gradually ease Day 3 (15 Feb) onward.

Initially Quiet geomagnetic activity is likely. During Day 1 and into early Day 2 with the potential CME arrivals, G1/Minor Storm intervals become likely with a chance of G2/Moderate Storms. Any combined impacts bring a slight chance of G3 Strong Storms. CME influence will then ease later Day 2 into Day 3, with activity becoming mainly Quiet to Unsettled by Day 4 (16 Feb).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is currently just below the S2/Moderate Radiation Storm threshold. Further enhancements are possible associated with potential CME arrivals from Day 1 into Day 2 (13-14 Feb), along with any significant flares from the large region in the southwest. In the absence of further enhancements, energetic particles are most likely to follow a declining trend, likely falling back below the S1 threshold Day 2 into Day 3 (14-15 Feb).

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	70	40	5	1
Strong	G3	No	15	10	1	1
Severe	G4	No	2	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	80	80	75	70
Very Active	R3 to R5 X	No	25	25	20	20

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	Yes	100	70	40	20
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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